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International Economics Department
The World Bank
August 1990
WPS 479

Conversion Factors

A Discussion of Alternate Rates and Corresponding Weights

Michael Hee

Time series of alternative conversion factors and of corresponding weights provides the framework for estimating overall conversion factors that are analytically relevant and meaningful.

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This paper — a product of the Socio-Economic Data Division, International Economics Department — is part of a larger effort in PRE toward a more versatile approach to estimating conversion factors for the *World Bank Atlas* and operational purposes. Copies are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Estela Zamora, room S7-136, extension 33706 (59 pages, including tables).

The significant operational implications underlying the Bank's estimates of per capita GNP represent important considerations in systematizing the use of official and other exchange rates in determining the exchange rate to be used in the Bank's Atlas methodology. Hee explores the potential for a system of time series for various conversion factors and a corresponding set of time series for weights.

The framework is useful for countries with multiple exchange rates. It gives us a way to develop time series on parallel and black market exchange rates, purchasing-power parities, trade-related taxes and subsidies, and potentially more.

The starting premise is that a single official exchange rate has a weight of 1.0 in all years; all other rates (implicitly) have zero weights. A major component of this framework is the redistribution of weights among multiple exchange rates.

Such a matrix of conversion factors and corresponding weights could provide the mechanism (1) for a systematic approach to weighting alternative rates; (2) for estimating the effects of alternative weighting schemes; (3) for determining the effects of incorporating parallel or black market exchange rates; (4) for providing the basis for less erratic and unpredictable fluctuations in the data in the *World Bank Atlas* and *World Tables*; and (5) for improved and more transparent documentation of methods and "special" cases.

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SUMMARY AND CONCLUSIONS

The significant operational implications underlying the Bank's estimates of per capita GNP, represent important considerations in systematizing our use of official (and other) rates in determining the exchange rate to be used in the **Atlas** methodology. The paper explores the potential for a system of time series for various conversion factors, and a corresponding set of time series for weights (Table 1).

The International Economics Department (IEC) has expanded the availability of the repertoire of exchange rates; a major task in this system, however, is the redistribution of weights among multiple rates.The starting premise is that a single official rate has a weight of 1.0 in all years; all other rates have (implicitly) zero-weights. We can examine the issue of how the "composite" conversion factor would look like if such rates have non-zero weights. IEC's practice is to take into account such multiple exchange rates and to the extent data are available, estimates an appropriate conversion factor from a multitude of exchange rates prevailing in a country (see the examples of Egypt and Syria).

In this connection, the paper reviews the main concerns about the adequacy of the official exchange rate as a general conversion factor when in effect countries maintain dual or multiple exchange practices, or there are active foreign exchanges in the parallel or black markets, or that there is a high incidence of price controls and trade-related restrictions.

One aspect receiving special attention is the compilation of a general purpose (composite) conversion factor from a set of multiple exchange rates for different types of international transactions. The paper identifies the kinds of evidence that are relevant in assessing the impact of these practices on exchange rates; provides illustrative examples of IEC using the evidence to derive alternative conversion factors (Tables 4 and 5), and concludes by identifying countries where review, and adjustment if necessary, of the official exchange rate merit serious consideration. These countries are shown in the Summary Table below. It is of interest to note that the countries emerging from this paper as needing review of their official exchange rates cover some 70 percent of countries listed in the Fund's **Annual Report on Exchange Arrangements and Exchange Restrictions** as having "cost-related import restrictions" and/or maintaining multiple exchange rates for exports and imports.

It should be emphasized that adoption of approaches suggested in the paper will not necessarily lead to an unambiguous conclusion regarding the "right choice" of the conversion factor. It must also be recognized at the outset that any adjustments to the official exchange rate require intimate knowledge of the trade and exchange system of the country concerned. Nevertheless, these approaches improve the basis for judgments that will always be required in such a decision. More information from and regular discussions with Regional economists will, hopefully, lead to the assembly of adequate information to enhance the robustness of such judgments.

Summary Table: Countries Recommended for Review/Adjustment of Exchange Rates

(1) DEVIATIONS of MULTIPLE RATES

>30%	>20% < 30%	>15% <20%	>10% <20%
# Egypt	Bahamas		# Yemen AR
# El Salvador			
# Guatemala			
# Paraguay			
# Romania			
# Venezuela			

(2) DEVIATIONS of BLACK MARKET RATE

>30%	>20% < 30%	>15% <20%	>10% <20%
# Afghanistan	# Argentina	Chile	Bahamas
Algeria	Botswana	# Jamaica	S. Africa
# Bangladesh	Haiti	Korea	Yugoslavia
# Egypt	India	# Sudan	Zaire
Ethiopia		Thailand	
# Guyana			
# Hungary			
# Kenya			
Libya			
Morocco			
Myanmar			
# Nicaragua			
# Nigeria			
# Paraguay			
# Peru			
# Poland			
# Romania			
# Syria			
Trinidad & Tobago			
Tunisia			
# Venezuela			
# Zambia			
Zimbabwe			

Identified in the Fund's **Annual Report on Exchange Arrangements and Exchange Restrictions** as maintaining multiple exchange rate system.

(3) TRADE TAXES ("Implicit Tariff Rates")

>30%	>20% < 30%	>15% <20%	>10% <20%
	Burundi	Bangladesh	* Belize
	Guinea-Bissau	* Pakistan	* Burkina Faso
	* India	* Sudan	Comoros
		Uganda	* Egypt
			Gambia
			Ghana
			* Iran
			Myanmar
			* Peru
			Sierra Leone
			* Somalia
			Sri Lanka
			Togo
			Tunisia
			* Vanuatu
			Venezuela
			* Yemen AR

(4) VOLATILITY in EXCHANGE RATES and TRADE VOLUME

Select countries on basis of Volatility in quarterly exchange rates (e.g. Argentina, Brazil, Yugoslavia.)

I. INTRODUCTION

A System of Conversion Factors and Weights

1. This paper discusses issues and procedures to develop a time series of alternative conversion factors with corresponding weights for use in converting and presenting macro-level country statistics in a common unit of account, e.g. the U.S. dollar. The potentially significant operational implications underlying the Bank's estimates of per capita GNP for the Operational Guidelines represent important considerations in the search for an appropriate conversion factor, notably for use in the **Atlas**. The discussion is set within the context of IEC's present procedures for choosing exchange rates for use in the **Atlas** and the Operational Guidelines.[1] Departures from the use of an exchange rate that is not closely related to the rate at which international transactions actually take place are tolerated over a wide range. However, when the deviation between the official rate and the rates effectively applied to foreign transactions are egregiously large, any conversion of principal macroeconomic indicators based on the official exchange rate are rendered meaningless.

2. The Bank's practice in choosing conversion factors involves IEC staff systematically reviewing and occasionally estimating alternative conversion factors, often involving dialogue with country operational staff. When "conditions are egregiously different from those

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[1] A review of the methodological issues, including choosing appropriate conversion factors, relevant to the calculation of per capita GNP for operational purposes is found in "Per Capita Income - Estimating Internationally Comparable Numbers," (International Economics Department, World Bank, January 13, 1989). See, in particular, Annex 4 which discusses the search for better conversion factors.

prevailing under free trade, alternative conversion factors are estimated that are deemed to reflect the actual rate at which foreign transactions take place. Such estimates seek to take into account the nature and restrictiveness of trading regime, information on relative prices, and the evolution of real exchange rates."[2] Estimating alternative conversion factors is a difficult process and, in part judgmental.In those highly egregious cases, the Bank attempts to estimate alternative conversion factors that permit meaningful calculations for intercountry comparisons.

3. The repertoire of exchange rates available has expanded. In addition to the official exchange rate[3] shown in the Fund's **International Financial Statistics (IFS)**, secondary and tertiary rates are also available in the **IFS**. In addition, IEC has created an internal file on parallel or black exchange rates from various sources. These are weekly or monthly quotations covering the period 1960-89 from **Pick's Currency Yearbook, International Report: Statistical Market Letter**, and **Africa Analysis**. Other rates (e.g., purchasing-power-parities, rates accounting for trade taxes and subsidies) can also be estimated, as explained later in the paper. With the increasing availability of country-specific multiple exchange rate data, the paper suggests that these alternate conversion factors be included in a system so that time series of alternate conversion factors can be made by choosing a preference order among different sets of conversion possibilities. Obviously the choice of preference order varies from country to country and also from year to year within each country.

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[2] **Ibid**; pp. 2-3.

[3] In general, the official exchange rate is that reported as line **rf** in IMF,**International Financial Statistics (IFS)** (Washington D.C.; International Monetary Fund).

4. A major task of this system is the assembly of appropriate weights. The starting premise in the envisaged system of alternative conversion factors and corresponding weights is that the official exchange rate has a weight of 1.0 and all other rates implicitly assigned zero-weights. It is expected that further review and analysis of the trade and exchange system by IEC staff, and more information from and regular discussions with Regional economists on various exchange rates will, hopefully lead to the assembly of information on some distributional weights to be attached to the various rates. Table 1 below illustrates the range of conversion factors and weights underlying this objective. It is expected that users and analysts can individually devise a set of simple rules to derive what may be called "the preferred" conversion factor.

Table 1: EGYPT -- System of Alternative Conversion Factors and Weights

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Iternative Conversion Factors										
Principal (official) rate (IFS_RF)	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.8516
Secondary rate	NA	0.7390	0.8317	0.8317	0.8317	1.3010	1.3503	1.5015	2.2128	2.5712
3. Tertiary rate	NA	1.0100	1.1300	1.1453	1.2543	1.5488	1.8838	2.1459	2.5082	2.6452
4. Parallel/black market rate	0.7609	0.8772	1.0236	1.1039	1.2184	1.4588	1.8975	2.1894	2.5082	2.6452
5. Purchasing Power Parity Rate (1970) /1	0.5917	0.5503	0.5893	0.6133	0.6553	0.6914	0.7849	0.9079	1 1850	-
6. Purchasing Power Parity Rate (1980) /1	0.7000	0.6510	0.6971	0.7255	0.7752	0.8179	0.9285	1.0740	1.4018	-
7. Purchasing Power Parity Rate (1987) /1	0.4562	0.4243	0.4544	0.4729	0.5052	0.5331	0.6052	0.7000	0.9137	-
8. Merchandise weighted conversion factor										
Weights										
1. Principal (official) rate (IFS_RF)	0.4350	0.4350	0.4350	0.4350	0.4350	0.4350	0.4150	0.3690	0.3200	-
. Secondary rate	0.3150	0.3150	0.3150	0.3150	0.1400	0.1400	0.1830	0.2370	0.2880	-
. Tertiary rate	0.2500	0.2500	0.2500	0.2500	0.4250	0.4250	0.4020	0.3940	0.3920	-
. Parallel/black market rate										
. Purchasing Power Parity Rate (1970)										
. Purchasing Power Parity Rate (1980)										
. Purchasing Power Parity Rate (1988)										
. Merchandise weighted conversion factor										
Memo Items										
Nominal exchange rate index (1980=100)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	82.2
Real exchange rate index (1980=100) /2	100.0	93.1	98.6	102.1	109.4	115.2	129.7	148.3	193.0	-
"Weighted Avg. Conversion Factor"	0.7152	0.7898	0.8490	0.8528	0.9540	1.1449	1.2949	1.4596	1.8445	

/1 The purchasing power parity relationship is computed as $R_o * (P_{d,t}/P_{f,t})$, where R_o is the exchange rate in the base year "0". $P_{d,t}$ and $P_{f,t}$ are the domestic price index and US (or any other foreign country) price index, respectively, in time period "t" (see Chapter V below).

/2 Nominal exchange rate index divided by relative domestic absorption deflator index; this shows the real exchange movement.

5. Such a matrix of conversion factors and corresponding weights could provide the mechanism for the following: (a) a systematic approach to the weighting of alternative rates; (b) estimating the effects of alternative weighting schemes, (c) determine what would be the effects of incorporating parallel or black market exchange rates; (d) provide the basis for less erratic and unpredictable fluctuations in the data shown in the **Atlas, World Tables** etc. and (e) improved and more transparent documentation of methods and "special cases."

Scope of Paper

6. The focus is on conversion factors that are as representative as practicable of transaction or "effective" conversion factors. The choice of an appropriate conversion factor is based on the clear principle that the rate chosen must be that at which foreign transactions are effected. The Bank, like the Fund or any other international institution, would prefer to convert national currency data into a common numeraire at prevailing market exchange rate.[4] Determining the prevailing market rate, however, is a matter of judgment, even for international transactions and in the absence of exchange and trade restrictions. It must be stressed at the outset that much is beyond the scope of this paper.In particular, the search here is not for an "equilibrium" exchange rate or that which is sustainable and compatible with reasonable economic growth and a viable balance of payments situation in the medium term. Suffice to say, countries are seldom in equilibrium and the labelling of an exchange rate as "being in equilibrium" is usually associated,

[4] The technical issues of using the period average of the official exchange rate as a convenient and readily available conversion factor, and the primary requirements for moving from shorter period to longer period rates are discussed in Section VIII.

explicitly or implicitly, with a complex policy network and policy changes that bring the rate to the "equilibrium" level.[5]

7. The paper emphasizes the implications for Bank estimates of per capita, the kinds of evidence relevant in assessing the underlying conversion factors, and identifies countries where review, and adjustment if deemed necessary, of the official exchange rate merits serious consideration. The paper provides illustrative examples in using the evidence to derive alternative conversion factors.

8. This paper takes the view that the exchange rate (conversion factor) is a price used in international transactions. Restrictions introduced into the price system in international transactions impact on the domestic relative price level. The reliance, in general, on the official exchange rate sometimes produces substantial discrepancies in the data. The paper reviews the main concerns about the adequacy of the official exchange rate as a conversion factor when in effect countries maintain dual or multiple exchange practices, or there are parallel or black market foreign exchange activities, or there is a high incidence of price controls and trade-related restrictions. One aspect receiving special attention is the compilation of a general purpose conversion factor from a set of multiple exchange rates for different types of international transactions.

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[5] A useful survey of this topic is given in G.G. Johnson, "Formulation of Exchange Rate Policies in Adjustment Programs," IMF Occasional Paper, No. 36 (Washington,D.C.: International Monetary Fund, August 1985).

9. The existence of a parallel or secondary market, where a portion of current transactions takes place at floating exchange rates that are more depreciated than the rate in the official market, is *prima facie* evidence that the official exchange rate may be inappropriate and therefore, requires further review. Also, *a priori*, it is reasonable to expect that countries with price controls and trade-related restrictions would exhibit large deviations between the transaction and official rates.

Magnitudes of Deviations as Signals

10. Any large deviations of the respective conversion factors from the official rate should be taken as signals that further review of the adequacy of the official exchange rate as an appropriate conversion factor is warranted. When the official exchange rate is judged to diverge by an exceptionally large margin from the rate effectively applied to international transactions, that serves as to signal that an alternate conversion factor needs to be estimated if conversions are to be meaningful. Any decision on the preference order between alternative conversion factors would have to take into account relevant country-specific knowledge, not just the magnitudes of the deviations between the two rates. For example, where we know national compilers used the official exchange rate to assign a national currency value to international transactions, that rate must be used as the conversion factor, regardless of whether it was the rate actually applied to international transactions. Assume in this instance that the two rates (the official rate used by national compilers and the transaction rate) are significantly different. If a decision is made to use the known transaction rate as a conversion factor, say for GNP per capita computations, it is necessary that all the expenditure and value-added components of the national accounts

in local currency be "modified". This should be avoided. Notwithstanding that the official rate may be egregiously different from the transaction rate, the conversion factor to be used in the above instance should be the official exchange rate as used by the national compilers.

II. CONVERSION FACTORS and RELATIVE PRICE MOVEMENTS

Conversion Factor as a Price

11. This paper focuses on the search for conversion factors that reflect market valuations (prices). The market-valuation principle serves to measure the economic value of resource transferred between two economies. External transactions should be viewed as the exchange of goods for money. In this connection, the role of the conversion factor is to define the price of money in terms of goods. Whenever governments impose price and non-price measures in international trade, valuation or price (i.e. conversion factor) adjustments should be made that will serve to bring the valuation closer in concept to market value. The problem, therefore, is to determine how far the price deviates from or approximates the market valuation.

12. The exchange rate is the relative price of two national monies and must bear a close relationship to price level developments in the two countries. Thus the exchange rate determines the relative prices of traded goods and, therefore, international competitiveness. Thus the conversion factor should be considered as a "price" and, like any other price, it can influence the environment in which domestic and international transactions are conducted. As a price, the conversion factor appears as exogenous to any individual transaction in the market but endogenous to the aggregated system of market demands and supplies because

the conversion factor is determined by interacting supply and demand for foreign exchange. It is shifts in these supply and demand schedules that give rise to price (i.e., exchange rate) changes. Thus it should be recognized that the exchange rate is a price that balances the desire to exchange one currency for another in order to effect trade in goods and services. The introduction of restrictions into the price system prevents the price from fulfilling a stabilizing function of equalizing supply and demand, thus affecting relative prices, the profitability of individual activities, and thus resulting in distortions in resource allocations.

Conversion Factor and Price Levels of Traded/NonTraded Goods

13. The imposition of price measures (tariffs, specific taxes, import surcharges, advance deposits on imports, export taxes and subsidies, and multiple exchange rates) and non-price measures (quotas, licencing) alter relative price levels between sectors, e.g., traded goods and nontraded goods. Here we are confronted with the issue of the distinction between "traded goods (sector)" and "nontraded goods (sector)" as well as between "tradables" and "nontradables." In very general terms, traded goods can be regarded as those that can be imported (and exported), while nontraded goods are those without close, foreign-produced substitutes and must therefore be supplied by domestic producers. More specifically, traded goods can be regarded as "goods that are sufficiently substitutable with goods produced abroad that there exists an international market; nontraded goods are those that are not highly substitutable with foreign-produced goods so that international trade in these goods does not exist".[6] A very narrow dichotomy is that given in the foreign trade statistics in the

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[6] George A. MacKenzie and Susan M. Schadler, "Exchange Rate Policies and Diversification in Oil Exporting Countries," (Unpublished; International Monetary Fund, May 9, 1980) pg.3.

GDP accounts where GDP is divided into goods and services actually traded (exports and imports, i.e., "traded goods") and goods and services absorbed in the domestic economy ("nontraded goods").

14. Provided a market exists through which trade could potentially be conducted, a good need not actually be traded to be termed a "traded" good: it becomes a "tradable good." If one classifies as tradable any good that either is internationally traded or could be traded at some plausible range of variation in relative prices, then the tradable category becomes very broad indeed.

15. However, given the close integration of the traded and nontraded sectors in most economies, in practice the distinction between industries producing traded (tradable) goods and those producing nontraded (nontradable) goods is rather tenuous. Rather, a country's output can be thought of as lying along a spectrum of greater or lesser exposure to foreign competition. Goldstein and Officer[7] suggest the use of both trade flows and market behavior, particularly the degree of independence between domestic and foreign prices, in identifying tradable and nontradable commodities or industries. They suggest three complementary criteria to distinguish between tradables and nontradables: (a) the degree of foreign trade participation should be substantially higher for tradables than nontradables; (b) cross-country correlations of price changes should be much higher for tradables than

[7] Morris Goldstein and Lawrence H. Officer, "The Measures of Prices and Productivity for Tradable and Nontradable Goods", **Review of Income and Wealth**, Vol. 4, December 1979, pp. 413-425.

nontradables; and (c) tradables should be closer substitutes for traded goods from other countries than are nontradables.

16. Policies adopted to protect the domestic traded goods sector, such as import tariffs, export subsidies, quotas, licensing, have the immediate effect of increasing the domestic price of the commodities in question. Consider the following simple examples:

-- an importer pays the c.i.f. import price of $1.00 for a unit of product X. Converted at the official exchange rate of LC200.00 = $1, the price (i.e., the exchange rate) paid by the importer is LC200.00. A 10 percent tariff (or specific taxes, import surcharges) on X means that the importer effectively pays LC220.00 in the transaction. The price (i.e., conversion factor) increases from LC200.00 = $1 to LC220.00 = $1. A world market price of $1.00 now corresponds to a domestic price of LC220.00;

-- in the meat export industry, meat is sold at world market prices. The meat exporter receives the world market price of $1.00 per unit. Converted at the official exchange rate of LC200.00 to the dollar, the exporter receives a price of LC200.00. An export subsidy of 25 percent on that unit of export means that the exporter effectively receives LC250.00 in the transaction.

17. Specifically, for a country facing a given world price of traded goods, the domestic price of traded goods is simply the world price adjusted for changes in the domestic currency value of foreign exchange, so that price measures introduced into the trade system

have the immediate effect of raising the relative price of traded goods to nontraded goods. The new, higher relative prices of traded goods in terms of nontraded goods are likely to induce consumers to substitute nontraded for traded goods. The increase demand for nontraded goods puts pressure on the price of nontraded goods. The increase in the traded goods price raises the general price level. Higher wage demands aimed at restoring real wages drive up the cost of producing traded and nontraded goods. The pervasive effect on the real cost of domestic factors of production will impact on the competitiveness of the country's traded goods sector.

III. CONVERSION FACTORS and MULTIPLE EXCHANGE RATE PRACTICES

18. Multiple exchange rates arise directly when separate groups of foreign exchange transactions are conducted at different exchange rates; they also arise indirectly when a variety of taxes, subsidies, surcharges, or equivalent devices are applied to foreign exchange transactions.[8] Multiple exchange rates are usually adopted to address external payments difficulties by attempting to relieve the pressure on different elements of the external account. The most common features of multiple currency regimes are the maintenance of a preferential rate for essential imports, often combined with debt service payments; separate rates based on a distinction between capital and current transactions;[9] and a separate rate for some important current invisible payments.

Effects of Multiple Currency Practices on Conversion Factors

19. The operation of a system of multiple exchange rates leads to effects very similar to the intended results of a system of tariffs and subsidies. The percentage difference between

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[8] For a broad historical review of country experiences with multiple exchange systems, the reasons for resorting to such system, their outcome, and the significance for the Fund in terms of its jurisdiction and maintenance over the international exchange system, see the following unpublished documents of the International Monetary Fund: "Review of Experience with Multiple Exchange Rate Regimes", (SM/84/64), March 19, 1984; "Review of Multiple Exchange Rate Regimes - Background Information", (SM/84/65), March 20, 1984; and "Multiple Currency Practices Applicable Solely to Capital Transactions", (SM/85/19), January 19, 1985.

[9] For a discussion of issues arising from dual exchange rate markets for capital and current transactions, see Anthony Lanyi, "Separate Exchange Markets for Capital and Current Transactions," **IMF Staff Papers**, Vol. 22 (Washington D.C.: International Monetary Fund, November 1975) pp. 714-49.

the exchange rate applicable in a particular transaction and the basic (official) rate can be regarded as a tariff on imports, or a subsidy on exports. The impact of these rates is on goods where relevant consumption and production decisions are sensitive to relative price changes brought about by the application of differentiated rates for traded goods. In principle, a set of differentially appreciated and depreciated rates should provide similar economic incentives and distortions to those resulting from a system of subsidies and tariffs. In terms of its effect on price and resource allocations, the application of a depreciated rate to "non-essential" imports to foster import substitution by domestic producers is similar to the imposition of a tariff on imports that compete with domestic production;[10] essentially, the importer and the domestic consumer pay a domestic price that is higher than the world market price (i.e.; more local currency per unit foreign currency).

20. The choice between multiple currency practices and a system of taxes and subsidies may be based on administrative feasibility.[11] On the other hand, multiple rates may be considered less expensive to administer than a system of taxes and subsidies that require complicated administrative machinery.

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[10] The very similar effects on prices and resource allocations of multiple exchange rates and a system of tariffs/taxes and subsidies are discussed in details in, John F. Laker, "Fiscal Proxies for Devaluation: A General Review," (Unpublished; International Monetary Fund, October 21, 1980); and George A. Mackenzie and Susan M. Schadler, "Exchange Rate Policies and Diversification in Oil Exporting Countries," (Unpublished; International Monetary Fund, May 9, 1980).

[11] The basic problems in the use of fiscal proxies for exchange rate changes are discussed in John F. Laker, "Fiscal Proxies to Devaluation," (Unpublished; International Monetary Fund, October 21, 1980).

Incidence of Multiple Currency Practices

21. The incidence of multiple exchange rates among Fund members is shown in Table 2. The Fund's **Annual Report on Exchange Arrangements and Exchange Restrictions** has reported that developing countries have, in general, moved towards reduced reliance on multiple currency practices, or made progress in either simplifying multiple currency practices, or in reducing the distortions associated with them.[12] A look at Table 2 reveals that virtually all countries with multiple currency practices employ different rates for different types of imports (e.g.; essential imports against payments on invisibles) as well as for exports. Multiple exchange rates for about 20 member countries are shown in the IFS.

Deviations of Multiple Rates

22. The existence of a multiple exchange system provides indications that the use of the official rate as a conversion factor is inappropriate. The larger the deviations in the multiple rates relative to the official rate, the stronger the reasons for a careful and systematic review of the various rates. The focus on multiple rates should be determined on the basis of the magnitude of the premium as well as the size of the market, i.e., how much economic activity is performed through this channel.

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[12] For a detailed discussion of developments in multiple currency practices, see International Monetary Fund, **Annual Report on Exchange Arrangements and Exchange Restrictions**, (Washington,D.C.; International Monetary Fund, 1986); pp. 18-20.

Table 2: Incidence of Multiple Currency Practices in Developing Countries

Country	Different Rates for Exports and Imports	Exports More Than 1 Rate	Imports More Than 1 Rate
*Afghanistan	x	x	x
* Argentina	x	x	
* Bangladesh	x	x	x
Bolivia	x	x	
Brazil	x	x	x
Colombia	x	x	x
Dominica	x	x	x
* Dominican Rep	x	x	x
Ecuador	x	x	x
* Egypt	x	x	x
* El Salvador	x	x	x
Gambia	x	x	x
Ghana	x	x	x
Grenada			x
* Guatemala	x	x	x
Guyana	x	x	
Honduras	x	x	x
* Hungary	x	x	x
* Jamaica		x	x
Kenya	x	x	
* Lao	x		x
* Mexico	x	x	
Nicaragua	x	x	x
Nigeria	x	x	x
* Paraguay	x	x	x
* Peru	x	x	x
* Poland	x	x	x
* Romania	x	x	x
* Somalia	x	x	x
* Sudan	x	x	x
Syria	x	x	x
Uruguay	x	x	
* Venezuela	x	x	x
Vietnam	x	x	x
W.Samoa	x		x
* Yemen AR	x		x
Zambia	x		x
Total	34	31	32

Source: Extracted from IMF, **Annual Report on Exchange Arrangements and Exchange Restrictions** (Washington DC:1989)

* Principal, secondary, tertiary rates, and their applicability to types of transactions are found in IFS.

23. Table 3 shows the distribution of deviations of multiple rates from the official rate of those countries for which multiple rates are available in the IFS.[13]

Table 3: Distribution of Deviations of Multiple Rates from IFS_RF

Range (%)	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
0.0-5.0	2	1	2	2	4	2	4	3	5	3
5.1-10.0	1	3	1	1	0	1	1	3	1	0
10.1-15.0	0	2	2	1	4	1	0	1	0	0
15.1-20.0	2	1	1	1	2	2	1	1	0	0
20.1-25.0	1	1	1	2	0	1	1	0	1	1
25.1-30.0	1	2	2	2	0	2	3	1	1	0
30.1-40.0	2	1	1	1	1	0	0	1	2	1
40.1-50.0	1	2	3	1	0	0	0	1	0	0
50.1-60.0	1	0	0	1	1	0	1	1	0	0
60.1-70.0	2	1	0	1	2	0	1	0	1	1
70.1-80.0	0	0	0	1	1	0	0	0	0	0
80.1-90.0	0	1	0	0	1	2	0	1	0	0
90.1-100.0	0	1	0	0	0	2	1	0	0	0
>100	0	0	1	3	3	3	4	2	3	1
TOTAL	13	16	14	17	19	16	17	15	14	7

Source: Multiple rates are from IFS.

24. Almost half of them maintain multiple rates with the premium exceeding 30 percent. In recent years, the spread between multiple rates has narrowed for most countries. However, the spread has remained consistently high in Egypt (exceeding 100 percent), Paraguay and Venezuela (about 90 percent), Guatemala (averaging 60 percent), and Romania (about 40 percent).

[13] As trade and exchange systems have been liberalized, and multiple exchange systems have been unified, the number of countries with multiple rates shown in the IFS has decreased.

"Composite" Conversion Factor

25. The proper use of multiple rates demands a "matrix" weighting approach, that is, a distribution of weights among the multiple exchange rates. What is envisaged here is a system with time series for multiple rates and a corresponding set of time series for weights. Obviously, adjustments to the official and multiple rates require intimate knowledge of the applications of respective rates to specific transactions. Two illustrative examples of IEC's attempt to develop the envisaged system for composite conversion factors are shown in Table 4 for Egypt, and Table 5 for Syria.

26. Table 4 below illustrates the Egypt situation where the multiple rates are from the IFS but the weights are from the Fund and Regional staff. Notice that the premium enjoyed by each of the rates in the secondary and tertiary markets is very significant.

Table 4: EGYPT -- Rates and Weights for Computing Average Exchange Rates from Multiple Rates

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	
Alternative Conversion Factors											
1. Principal (Central Bank) Rate		0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.8516
2. Secondary (Commercial Bank) Rate		NA	0.7390	0.8317	0.8317	0.8317	1.3010	1.3503	1.5015	2.2128	2.5172
3. Tertiary (Parallel) Rate		NA	1.0100	1.1300	1.1453	1.2543	1.5488	1.8838	2.1459	2.5082	2.6452
Weights											
1.1 Principal (Central Bank) Rate		0.4350	0.4350	0.4350	0.4350	0.4350	0.4350	0.4150	0.3690	0.3200	NA
1.2 Secondary (Commercial Bank) Rate		0.3150	0.3150	0.3150	0.3150	0.1400	0.1400	0.1830	0.2370	0.2880	NA
1.3 Tertiary (Parallel) Rate		0.2500	0.2500	0.2500	0.2500	0.4250	0.4250	0.4020	0.3940	0.3920	NA
"COMPOSITE" Rate [(1*1.1) + (2*1.2) + (3*1.3)]		NA	0.7898	0.8490	0.8528	0.9540	1.1449	1.2949	1.4596	1.8445	NA
Memo Items											
GNP per capita (using Principal Rate)		573	553	637	690	771	847	925	1034	1274	NA
GNP per capita (using "Composite" Rate)		NA	1432	798	582	611	606	576	561	592	NA
Ratio: "Composite" Rate/Principal Rate		NA	1.13	1.21	1.22	1.36	1.64	1.85	2.09	2.64	NA
"Composite" per cap/"IFS_RF" per cap		NA	2.59	1.25	0.84	0.79	0.72	0.62	0.54	0.46	NA

Source: Multiple rates are from IFS

Weights: 1980-85: Unpublished data from the Fund's Information Notice System;
1986-88: Regional Staff.

27. The respective premiums for the commercial (secondary) rate and the parallel (tertiary) rate are extremely high. Given such a high degree of deviation among the different rates, it is to be expected that the average of the multiple rates is significantly different from the official (Central Bank) rate. Perhaps what is more significant from the Bank's operational point of view is that with the shift (and therefore weights) away from the official (Central Bank) rate in recent years, its is likely that Egypt's per capita GNP will remain within the threshold for Bank's IDA eligibility.[14]

28. The Syria example (Table 5 below) is intended to illustrate the types of relevant information IEC staff can be expected to extract from various Bank and Fund documents to estimate a trade-weighted average of officially recognized exchange rates. The Fund's **Annual Report on Exchange Arrangements and Exchange Restrictions** lists Syria as maintaining multiple rates, but these rates are not available in the **IFS**. On the basis of information in the Fund's **Annual Report on Exchange Arrangements and Exchange Restrictions**, and unpublished **Recent Economic Development** on member countries, Table 5 below illustrates the procedures by which IEC staff, in consultation with Regional staff, derives a time series of multiple rates and a corresponding time series of weights.

29. As can be seen in Table 5, the impact of the 30 percent premium in the secondary market is dampened by the fact that transactions in this market is only about one-third of total transactions. Thus, the "composite" rate does not exhibit the wide margin of deviation

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[14] The Bank uses the weighted ("composite") exchange rate in the computation of Egypt's GNP per capita for the **Atlas** and the Operational Guidelines.

seen in the example on Egypt. This does not detract from the fact that there is a substantial differential in the GNP per capita estimate for the Bank's Operational Guidelines.

Table 5: SYRIA -- Derivation of Composite Exchange Rate

		1983	1984	1985	1986	1987	1988
	Multiple Rates						
1.	Principal Rate /1	3.95	3.95	3.95	3.95	3.95	11.225
2.	Secondary Rate: /1	5.45	5.45	5.45	5.45	5.45	..
3.	Tertiary Rate	5.70	7.06	8.80	9.81	10.00	..
	Derivation of Weights	**1. Principal (Official) Rate for Public Sector Merchandise Trade**					
	Exports % Total GNFS	20.9	21.8	20.4	16.6	19.3	..
	Imports % Total GNFS	48.9	49.3	44.9	36.7	33.0	..
	% Share in Total GNFS	69.8	71.1	65.3	53.3	52.3	..
		2. Secondary (Parallel) Rate for Private Sector Trade in Goods and NFS					
	Exports GNFS % Total GNFS	7.4	6.4	6.8	13.1	14.2	..
	Imports GNFS % Total GNFS	14.9	13.7	18.6	23.9	24.8	..
	% Share in Total GNFS	22.3	20.1	25.3	37.0	38.9	..
		3. Tertiary Rate for Tourism					
	% Share in Total GNFS	7.90	8.88	9.37	9.64	8.82	..
	Summary Weights						
1.1	Principal	0.70	0.71	0.65	0.53	0.52	1.00
2.1	Secondary	0.22	0.20	0.25	0.37	0.39	..
3.1	Tertiary	0.08	0.09	0.09	0.10	0.09	..
	****** "COMPOSITE" Rate ******	4.4225	4.5269	4.7844	5.0701	5.0676	11.225
	Computed as: [(1*1.1) + (2*2.1) + (3*3.1)]						
	Memo Items						
	GNP per capita (Atlas..principal rate)	1919	1849	1946	2053	2155	1954
	GNP per capita (Atlas..composite rate)	1703	1629	1670	1688	1701	1711
	Ratio: Composite rate to Official rate	1.13	1.15	1.22	1.29	1.29	1.00
	"Composite" per cap/"Atlas" per	0.89	0.88	0.86	0.82	0.79	0.88

Source: IMF, "Recent Economic Development" (Unpublished); March 6, 1987; and March 9,1988.

Countries for Review and Adjustment for Multiple Rates

30. The time series multiple rates and corresponding time series weights derived in Tables 4 and 5 form the crux of the envisaged matrix of conversion factors and weights.

31. The examples of Egypt and Syria illustrate the operational significance of the need for careful review of the presence of multiple conversion factors. Table 2 lists countries that should come under the type of review shown for Egypt and Syria. Given the continued high spread between these rates from the official rate and, therefore, the potential operational impact of per capita GNP estimates, particular attention should be directed at Egypt, El Salvador, Guatemala, Paraguay, Romania, and Venezuela.

32. It should be emphasized that a definitive assessment would require more information from and continued dialogue with Regional staff. Emphasis is placed, wherever data are available, on the applicability of the respective rates on the types of transactions.

IV. BLACK or PARALLEL MARKET EXCHANGE RATES

Formal and Informal Parallel Exchange Markets

33. Lindauer suggests that "a parallel market is a structure generated in response to government interventions which create a situation of excess demand or supply in a particular product or factor market which is both dependent upon conditions in the official market and responsive to market forces."[15] For example, the excess demand for foreign exchange in the official market, resulting from exchange controls, is satisfied at a premium price in a secondary, or parallel market. The official, and overvalued, exchange rate creates a parallel, usually called "black," market for foreign currency. A parallel exchange market is one of the by-products of restrictionist trade and exchange policies. Import and export duties, and import quotas generate parallel markets by creating excess demand for commodities at illegal, pre-tax prices. The removal of government interventions can unify an otherwise parallel market.

34. Are parallel markets always illegal? A formal parallel market typically is introduced when a government resorts to a secondary exchange system as a transitional measure to correct for external imbalance and, therefore, avoid a formal depreciation. Usually essential

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[15] David L. Lindauer, "Parallel, Fragmented, or Black? Defining Market Structure in Developing Economies," **World Development**, Vol. 17, No. 12 (Cambridge, MA: Harvard Institute for International Development, December 1989); pp. 1871-1880.

imports and exports are conducted at the (relatively overvalued) official rate, while other transactions, including capital flows, are assigned to the secondary exchange market. On the other hand, the tightness and effectiveness of exchange controls result in transactions that operate outside the normal and regulated channels, that is, in an informal secondary exchange market which is characterized by risks and penalty structure.

35. In this paper, the terms "black market" and "parallel market" are used interchangeably, as well as "illegal" and "unofficial" to refer to "market structures which result from suboptimal government interventions which create a situation of excess demand."[16]

Purchasing Power Parity and Factors Affecting Parallel Market Rates

36. In his empirical paper on black markets for currency, Culbertson[17] postulates that given the official exchange rate, changes in the parallel market rate will occur due to shifts in either the supply or demand schedule for foreign exchange. One of the most likely sources of change stems from variations in the equilibrium rate. Since the equilibrium or market-clearing rate is unobservable, it is proxied through the ratio of domestic-to-foreign price level -- i.e., the purchasing power parity relationship is instrumental in determining the (unobservable) equilibrium rate. A secondary consideration concerns the role of the government's holdings of international reserves, especially foreign exchange holdings.

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[16] Lindauer, **Op.cit.**, pp. 1878.

[17] W. Patton Culbertson, "Empirical Regularities in Black Markets for Currency," **World Development**, Vol. 17, No. 12 (Cambridge, MA: Harvard Institute for International Development, December 1989); pp. 1907-1919.

Consider the following exchange-control scenario in Culbertson's study: an overvalued currency produces a supply of foreign exchange; a black market price of foreign exchange emerges as the government allocates this quantity to the market (e.g. to importers, investors, travel abroad, etc.); consider further that the government may choose to add to its reserve holdings, in which case the supply of foreign exchange is reduced; or the government may choose to draw down its reserves, thus increasing the supply of foreign exchange. Consequently, changes in the level of foreign exchange holdings represent a potential influence on the parallel market rate.

37. Culbertson's study for 10 countries with long-existing exchange controls and black market activity lends support for the hypothesis that the black market rate depends on the level of the official rate, the foreign-to-domestic price level (which proxies the unobservable equilibrium rate), and government reserve-level policy. The strongest coefficients are those relating the black market rate to changes in the foreign-to-domestic price level. While the R^2 are relatively robust for most of the countries (see the following chapter for a discussion of purchasing power parities as conversion factors), the large degree of serial correlation is disturbing. This indicates the danger of inferring that only those variables with significant coefficients are important.

38. The supply of foreign exchange in this market may come from various sources. Over- and underinvoicing of exports and imports could potentially attract significant amounts of foreign exchange to the black markets over time. Also, if the premium on foreign currency is significantly higher than the official rate, a significant proportion of remittances would

eventually pass through the illegal market. Another potential source of generating a higher volume of foreign exchange in this market is smuggled exports, though conclusions on the level of smuggling is largely impressionistic. An important factor determining the level of the black market rate is the nature and extent of the risk and penalty structure faced by sellers who circumvent foreign exchange controls. Suppliers of foreign exchange in the black market. In general, the black market rate is likely to be more depreciated than the official (and restriction-free) rate. This is more so in a situation where there is strict imposition of foreign exchange controls and the emergence of expectations of depreciation. Proper caution should be exercised, however, in using the black market rate as an indication of the appropriate exchange rate.

39. While the estimated coefficients in Culbertson's study should be treated with caution, the empirical results suggest that:

> "black market exchange rates are largely determined by and reflect fundamental economic developments.... ..... the exchange rate is the relative price of two national monies and, while influenced by myriad factors, must bear a close relationship to price level developments, and hence monetary conditions in the two countries." [18]

Parallel Market Rates and Market Information

40. If the exchange rate is itself a price upon which economic agents must rely in making decisions about resource allocation, then a question in an exchange-control economy posed by Culbertson is whether the parallel market rate better reflects available information on price developments, including current expectations about the future price level, than the

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[18] Culbertson, **Op.cit.**, p. 1917

official rate. Indeed, the very fact that a parallel or secondary market, where a portion of current transactions takes place at floating exchange rates that are usually more depreciated than the rate in the official market, exists is evidence of the inappropriate level of the official rate.[19] Without the black market, there would be little if any guide to indicate just how overvalued the official rate had become. The official exchange rate changes only at intervals and can hardly react to or reflect constantly changing economic conditions. Consequently, Culbertson's empirical study hypothesizes that it would seem that a *prima facie* case can be made that the black market rate is likely to be a better guide to efficient resource allocation than the official rate.

41. If black market rates fully reflect all historical price information, including current expectations about the future rate, then the current price will provide good prediction of next period's price. To assess how well black market rates seem to meet this criterion of "market efficiency", Culbertson regresses current period black market rates on previous period rates. The principal conclusion from the regression suggests that the behavior of black market rates is consistent with the broad principles of the efficient markets hypothesis.

42. The focus on the parallel exchange market should be determined on the basis of its size, that is, how much economic activity is performed through this channel. In addition, the

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[19] Culbertson, **op.cit.**, pp. 1915-1916; see also Ahsan H. Mansur, "Determining the Appropriate Levels of Exchange Rates for Developing Economies," **IMF Staff Papers**, Vol. (December 1983), pp. 784-818; and G.G. Johnson, "Formulation of Exchange Rate Policies in Adjustment Programs," International Monetary Fund, **IMF Occasional Paper**, No. 36 (Washington, D.C.:International Monetary Fund, August 1985).

extent to which the legal parallel market rate is allowed to float and react to market forces, and the demand and supply elasticities of foreign exchange in the official market relative to the secondary market will help draw some tentative inferences about the appropriateness of the official rate as a conversion factor.

43. Although for many developing countries the illegal or black market can be quite sizeable and potentially influential in the trade and exchange system, it is rarely possible to assign (or agree on) a weight to the parallel market. The very nature of parallel markets makes it difficult to assess total quantities marketed, since many small traders are likely to be involved. Black or parallel market rates are seldom documented. Therefore, it is too large a leap to reach the conclusion that the exchange rate prevailing in the parallel (especially that in the illegal parallel) market is necessarily a reliable indicator of the (unobserved) equilibrium rate.

Deviations of Black Market Rates

44. Table 6 shows deviations of the black or parallel rates from official rates. Again, caution must be exercised in reading the significance of the deviations from official rates. These do not necessarily provide a direct indication of the appropriate exchange rate. The divergence between the official and black market rates also depends very much on the penalty structure, that is, the rigor of its enforcement and the extent to which participants in black market exchange transactions are apprehended and prosecuted. Nevertheless, it is useful to know parallel market rates (and their deviations) if only to set upper limits for

what the Bank's Regional staff sometimes advocate as rates to replace official rates in those cases where IEC and the Region agree that official rates differ egregiously from transaction rates.

Table 6: Frequency Distribution of Deviation of Parallel/Black Market Rates from Official Rates (percent)

% Deviation	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	198
0-10	49.4	44.3	53.8	57.7	48.7	49.4	48.1	40.5	34.2	29.5	33.9	37.1	28.6	28.
11-20	10.1	13.9	9.0	6.4	12.8	12.7	10.1	10.1	11.4	14.8	13.6	9.7	16.3	17.
21-30	6.3	5.1	7.7	5.1	6.4	7.6	6.3	3.8	6.3	9.8	3.4	14.5	6.1	7.5
31-40	2.5	5.1	2.6	5.1	2.6	3.8	2.5	1.3	5.1	6.6	6.8	1.6	4.1	5.7
41-40	8.9	5.1	1.3	1.3	2.6	1.3	5.1	8.9	3.8	1.6	1.7	1.6	10.2	5.7
51-60	0.0	1.3	1.3	1.3	5.1	0.0	3.8	8.9	5.1	1.6	1.7	4.8	0.0	3.8
61-70	2.5	1.3	3.8	1.3	3.8	5.1	3.8	3.8	1.3	1.6	6.8	0.0	4.1	3.8
71-80	2.5	2.5	2.6	3.8	2.6	2.5	2.5	5.1	2.5	4.9	1.7	1.6	0.0	0.0
81-90	1.3	2.5	1.3	3.8	3.8	0.0	1.3	1.3	1.3	1.6	1.7	0.0	0.0	0.0
91-100	5.1	1.3	1.3	1.3	0.0	3.8	0.0	1.3	1.3	3.3	3.4	0.0	2.0	1.9
>100	11.4	17.7	15.4	12.8	11.5	13.9	16.5	15.2	27.8	24.6	25.4	29.0	28.6	26.
No. of Countries	79	79	78	78	78	79	79	79	79	61	59	62	49	53
Deviations > 30%	27	29	23	24	25	24	28	36	38	28	29	24	24	25

Sources: 1975-1983: **Pick's World Currency Yearbook** (various issues);

1984-1988: **Financial Times International Reports: Statistical Market Letter** (weekly issues)

Countries for Review and Adjustment for Parallel Rates

45. Table 7 below shows countries with egregious (say, 30 percent or greater) deviations between the black market and official rates. They represent that set of countries for which the appropriateness of the official rate as a general conversion factor merit further review and adjustments, if deemed necessary. Also, a closer look at the deviations of the black or

parallel market rates from the official exchange rates reveals half of the countries with such egregious deviations are characterized by the maintenance of dual or multiple exchange systems (see Table 7 below). The significance of these relatively large deviations is

Table 7: Ratio of Parallel/Black Market to Official and Atlas Exchange Rates

	Black to Official Rate (Official = 1.00)		Total Trade % GDP
	1987	1988	(Avg.1987-88)
Algeria	7.64	na	28.7
* Romania /1	5.70	6.42	na
* Syrian Arab Rep.	5.66	1.98	31.5
Burma	4.32	4.50	na
* Afghanistan /1	3.95	na	na
Iraq	3.76	3.76	na
* Poland /1	3.40	4.10	41.6
* Egypt /1	3.13	3.58	50.0
Zambia	3.06	3.04	64.0
* Bangladesh /1	2.91	2.84	23.2
* Nicaragua	2.81	na	na
Ethiopia	2.54	2.54	33.9
Zimbabwe	2.42	2.83	51.5
Libya	2.34	2.41	na
* Peru /1	2.27	2.27	23.8
* Guyana	2.05	3.58	149.5
* Venezuela /1	1.93	2.32	46.8
Tunisia	1.68	1.62	78.2
South Africa /1	1.61	1.14	50.8
* Paraguay /1	1.46	1.69	54.6
Trinidad and Tobago /1	1.46	1.33	72.5
* Hungary /1	1.46	1.43	74.4
* Nigeria	1.44	1.58	53.0
Morocco	1.42	1.46	49.6
* Kenya	1.32	1.32	44.8
Zaire	1.31	0.86	73.9

* Countries identified in IMF, **Annual Report on Exchange Arrangements and Exchange Restrictions** as maintaining multiple exchange systems.

/1 Principal, secondary or tertiary rates for these countries are available in **IFS.**

further heightened by the importance of total external trade in GDP. It is clear that the combination of large deviations and large trade shares in GDP provides prima facie evidence that adjustment of official exchange rate as a general purpose conversion factor should be accorded serious consideration.

46. IEC has expanded its collection of various exchange rates to include parallel or black market rates. For Operational Guideline purposes, black market rates have zero weights. They are used only to shed light on conversion issues and set outer limits on any possible adjustment of conversion factors.

47. Should "unofficial" exchange rates, in addition to officially recognized multiple exchange rates, be used to obtain reasonably meaningful estimates for per capita GNP? In principle, the conversion factor used by the Bank to transform major macroeconomic aggregates in local currencies into a common numeraire should reflect the effective transaction rates used in international transactions. In addition, for the resulting overall conversion factor to be analytically relevant and meaningful, the major macroeconomic variables, such as GNP, should reflect consistently the relative prices implicit in the effective transaction rates believed to apply. Therefore, the effective transaction rates should refer to all the various rates at which foreign transactions take place, including "unofficial" exchange rates. Failure to attach any importance to the unofficial rates which are known to prevail (because they are "unofficial" or "illegal") gives rise to both price and conversion distortions which will tend to show up in erratic trends in derived per capita GNP estimates.

It should be stressed, however, that consistency must prevail, that is, the effective transaction rate encompassing all (official and "unofficial") rates becomes a relevant and meaningful conversion factor only if the macroeconomic aggregates in local currencies reflect consistently the relative prices implicit in the effective transaction rates believed to apply (cf.para.10).

48. The Harvard Institute for International Development-sponsored workshop on parallel markets in developing countries provided clear indications that "increasing attention to parallel markets in general has arisen in response to price controls," .....that "although economists increasingly recognize the importance of parallel markets, many policy analysts treat them as an inconvenience to be avoided," ..... and, in the face of pervasive price controls and market interventions by governments in developing countries, "parallel markets can compromise the policy prescriptions that are part of most reform packages and can lead to different interpretations of the benefits of reform." [20]

49. While recognizing the importance of parallel or black markets in many developing countries the Bank, however, should be mindful of the risks of using statistics pertaining to what are in many countries illegal activities.

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[20] A summary of the major contributions to the workshop on parallel markets in developing countries sponsored by the Harvard Institute for International Development (November 11-12, 1988) is found in Christine Jones and Michael Roemer, "Editors' Introduction:Modeling and Measuring Parallel Markets in Developing Markets," **World Development**, Vol. 17, No. 12 (Cambridge, MA: Harvard Institute for International Development, December, 1989); pp. 1861-1870.

V. PURCHASING POWER PARITY as CONVERSION FACTORS

Purchasing Power Parity (PPP)

50. The purchasing power parity (PPP) theory of exchange rates argues that the foreign exchange value of a national currency is largely determined by the purchasing power of that currency relative to the purchasing power of foreign currencies.[21] Two aspects of the PPP doctrine deserve attention. The more fundamental element focuses upon the manner in which the relation between national price levels leads to market-clearing exchange rates for national currencies. This argument hypothesizes that changes in relative price levels dominate exchange rates changes rather than vice versa. Thus PPP involves a relationship between a country's foreign exchange rate, on the one hand, and its price level or price movement compared to the foreign price level or movement, on the other, that is, the exchange rate is determined by the level of prices in the domestic currency compared to that abroad, that changes in the exchange rate are determined by changes in these price levels, and that the percentage change in the exchange rate per month, quarter, or year is determined by inflation at home relative to that abroad over these time intervals. Thus in the PPP, relative inflation movements are offset by exchange rate changes. PPP may be

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[21] A comprehensive discussion of various aspects of the purchasing power parity doctrine is given in Lawrence H. Officer, **Purchasing Power Parity and Exchange Rates** (Greenwich, Connecticut: Jai Press, 1982); see also Alan C. Shapiro, "What Does Purchasing Power Parity Mean?" **Journal of Money and Finance**, Vol.2, No. 3, December 1983, pp. 295-318.

expressed in terms of price movements rather than levels, with price movements measured by price indices:

$$E_t = P_{d,t}/P_{f,t}$$

where

E_t = the exchange rate expressed as the number of domestic currency units per unit of local currency at time t;

P_d = domestic price index at time t; and

P_f = foreign price index at time t.

Alternatively, the purchasing power parity of the domestic currency with respect to the foreign currency can be expressed as:

$$(P_{d,t}/P_{f,t}) * R_o$$

where Ro is the actual or "market" or current exchange rate in the base year "o" and not necessarily equal to the "equilibrium" rate defined in any manner. Purchasing power parities for Egypt are shown in Table 1 above.

51. PPPs are distinct from and not necessarily equal to the "equilibrium" exchange rate, defined in any manner. They do not measure the degree of overvaluation or undervaluation of a currency. In the absence of other influences PPPs can, however, serve as a guide to the levels of equilibrium exchange rates between the various currencies provided that the base period chosen is one in which equilibrium values prevailed.[22] PPPs become all the more

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[22] William P. Culbertson, "Purchasing Power Parity and Black-Market Exchange Rates," **Economic Inquiry**, Vol. 13, June 1975, p. 287.

applicable if trade restrictions and exchange controls are sufficiently high and comprehensive to distort the official exchange rate.

PPP and Data Conversion

52. Probably the most generally accepted use of PPP is as a conversion factor, given the simplicity of the PPP approach, the ease in calculating relative PPP measures, and the intuitive appeal of PPP as a valid theory. International comparison of real output in different countries requires that the conversion rate reflect relative price levels. The absolute PPP measure ($E_t = P_{d,t}/P_{f,t}$) founded on the GDP price level has been used for the currency conversion of the national accounts data at finely disaggregated levels of expenditure by Kravis.[23]

What Price Measure to Use in PPP Computations

53. The individual prices used to construct the price level or price index for PPP must be presumed to reflect accurately the prices at which transactions occur in a free market. In a multicommodity world with relative price changes, differing consumption preferences across countries, nontraded goods, transportation costs, and trade barriers, the PPPs are likely to be distorted so that they do not reflect true relative purchasing power.

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[23] Irving B. Kravis, Alan W. Heston, and Robert Summers, **International Comparisons of Real Product and Purchasing Power** (Baltimore,MD: Johns Hopkins University, 1978).

54. Suggestions to the appropriate price index to use in computing and testing PPPs have "ranged from the price of the least traded commodity -- labor -- to an index of nontraded goods only, to the broadest domestic index available, to an index comprised only of traded goods, to individual prices of traded commodities." [24] Comparison of unit labor costs is beset with measurement problems. Among these are measurements reflecting differences in types and quality of labor; and adjustment for differences in productivity (traded goods sector only, nontraded goods sector only, or combination of both?). Price indices based on internationally traded goods (export and import price indices) are limited to a small class of commodities, relative to all goods and services, and are therefore subject to variations that presumably would not be present in a broad-based price measure. Also, traded and nontraded goods are not unvarying collections of commodities. There is never a definite group of commodities that can be exported. Changes in the structure of the economy or changes in profitability may widen or restrict the group of traded/exportable goods.In the same vein wholesale price indices (WPI) are also heavily weighted with traded goods. The use of cost-of-living indices (COL) requires that the weighting pattern be the same for each country's price level, that is, taking a common basket of goods with a standard system of weighting. The PPP theory essentially refers to the internal value of the currencies concerned, and variations in this value can be measured best by general index figures representing as far as possible the whole mass of commodities (and services), traded and nontraded, marketed in the country. This is reflected in the GDP deflator which is the price

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[24] Alan C. Shapiro, "What Does Purchasing Power Parity Mean?" **Journal of International Money and Finance**, Vol. 2, No. 3 , December 1983; pp. 295-318.

concept with a firm analytical foundation in PPP theory.[25] In essence, a PPP measure based on the GDP deflator is advocated since each country's own pattern of production provides the ideal source of weights to construct its price measure for PPP computation.

[25] See Lawrence H. Officer, "The Relationship Between Absolute and Relative Purchasing Power Parity," **Review of Economics and Statistics**, Vol. 60, November 1978, pp. 562-568

VI. TRADE and EXCHANGE TAXES and CONTROLS

55. Countries facing unsustainable external balance and payments difficulties, often react by imposing a variety of policy instruments and restrictions on the use of foreign exchange and/or to protect industry-specific industries. These include price measures such as tariffs, import surcharges, advance deposits for imports, export taxes, subsidies and multiple exchange rates, as well as non-price measures such as quotas, licensing, voluntary restraint agreements, and exchange controls. Over time and as a result of these ad hoc decisions rather than an overall policy design, the trade regulations become increasing complex.[26] Price measures, in general, can be expressed in terms of tariffs. Specific taxes or import surcharges are added to tariffs; the tariff equivalent of advance deposits is given by the interest foregone on loans designed to make the deposits; export taxes and import subsidies are regarded as negative tariffs; and the premium in the secondary exchange market can also be regarded as a tariff. In the case of nonprice measures, permissible levels of imports are set directly in quantitative terms. By restricting the amount of imported commodities made available on the home market, these measures lead to a rise in the domestic prices of the commodities in question. The excess of domestic price over world price can be regarded as an "implicit tariff."

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[26] For a comprehensive description of exchange rate arrangements and exchange controls, and changes in these as they occur, see International Monetary Fund, **Annual Report on Exchange Arrangements and Exchange Restrictions** (Washington,D.C.: International Monetary Fund, 1989).

56. The nature and extent of price measures and nonprice measure restrictions can alter relative prices and profitability between sectors, leading to distortions in resource allocations. Frequent increases in tariffs and import surcharges, the imposition or tightening of quantitative restrictions and resorting to multiple exchange rates for balance of payments purposes mean that the actual value of traded goods do not reflect the outcome of market forces. Tariffs and nontariff barriers and subsidy measures represent attempts by governments to offset the negative effects of the overvalued exchange rate by influencing domestic relative prices and, therefore, on import demand and export supply.

Trade Taxes on Gross Output and Value-Added

57. The impact of taxes and subsidies on relative prices and the profitability of industry-specific activities (with its attendant resource allocation implications) should take note not only of the tariff (and subsidy) structure on the final product but also on material inputs. From the point of view of the producer, not only tariffs and other protective measures on the final output matter but also tariffs levied on material inputs because the latter would reduce the domestic value-added. In export industries the increase in costs due to tariffs on material inputs may be compensated by the provision of export subsidies. Balassa concludes that tariffs and subsidies on gross output and intermediate inputs permit domestic industries to operate with a value-added higher than under tariff-free trade.[27]

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[27] Bela Balassa, "Industrial Protection in Developing Countries," Report No.EC-175, (Unpublished; The World Bank, June 1980).

Effects of Tariffs and Subsidies on Conversion Factors

58. The imposition of tariffs, surcharges and subsidies represents the use of "fiscal proxies" for exchange rate changes. Simply stated, such a policy may be designed to force imports competing with domestically traded goods to enter the country at a depreciated exchange rate (i.e.; at a higher domestic currency price) and/or to allow producers to export at a depreciated rate while preserving a higher exchange rate for other transactions. In essence, the imposition of import tariffs and export subsidies means that, effectively, importers pay more and exporters receive more local currency units per dollar than they would under free trade. It appears, then, that the price (i.e.; conversion factor) paid for or received under tariffs and export subsidies tends to overvalue the domestic currency as compared to the tariff-free trade situation and, in the process, raises the relative price of traded to nontraded goods.[28] On the other hand export taxes (and import subsidies) are regarded as negative tariffs.

59. The extent of the implications on international data comparability and on comparative analysis resulting from the reliance on the official exchange rate as a conversion factor depends on the incidence and magnitude of price measures and nonprice measures in international trade.[29] How prevalent are import and export taxes and subsidies in developing countries? Are tariff structures and schedules prohibitive? This is examined below.

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[28] See para. 15 above for simple numerical examples illustrating this.

[29] An overview of current developments in trade and exchange controls is presented in International Monetary Fund, **Exchange Arrangements and Exchange Controls**, (Washington,D.C.: International Monetary Fund, 1989); and International Monetary Fund, "Developments in International Exchange and Trade Systems," **World Economic and Fin .ncial Surveys** (Washington,D.C,: International Monetary Fund, September 1989).

Incidence of Trade Taxes and Exchange Controls

60. The Fund's **Annual Report on Exchange Arrangements and Exchange Restrictions** reports that, in general, most developing countries had adopted, or were edging towards more liberal trade policies at the end of the 1980s than they had before the external balance difficulties of the late 1970s, albeit from a considerably restrictive base. On the other hand the industrial economies, especially the EEC and the US, have intensified their recourse to quantitative controls. Given their varying forms and purposes and lack of transparency, it has been difficult to assess the incidence and quantitative impact of nontariff barriers on trade. They take many forms: import licensing, quotas, quantitative restrictions in the form of outright prohibition, voluntary export restraint arrangements, government procurement and state trading practices that may have some hidden discrimination against specific foreign suppliers, etc. But the end result of tariffs and quantitative controls is the same: they raise the price of imported goods in a particular market relative to prices without restrictions and relative to world prices.

61. Table 8 below shows the frequency distribution of developing countries by the size of the tariff rates, measured here as total, import, and export taxes as a percent of total, imports, and exports of goods and nonfactor services, respectively.[30] It is clear that many developing countries still resort to tariffs and import surcharges to deal with acute balance of payments difficulties. Duties on overall trade of 10 percent or greater are registered in about one-third of developing countries for which data are available. Other notable features

[30] Since trade flows and taxes used here are at the aggregated level, the implicit assumption is made that the tariff barrier, which in fact applies only to certain product groups, affects all trade.

in Table 2 are: (a) most of the taxes on international trade and transactions are imposed to curtail imports; (b) two-thirds of the developing countries for which data are available impose implicit import tariff rates of 10 percent or more; and (c) the duty rate on exports are relatively low though its incidence is still high.

Table 8: Distribution of "Implicit Tariff Rates"

"Implicit Tariff Rate" (Total Duties % Total Goods & Nonfactor Services)

Range(%)	1980 (%)	1981 (%)	1982 (%)	1983 (%)	1984 (%)	1985 (%)	1986 (%)	1987 (%)
0.0-5.0	21 (26.3)	23 (28.4)	24 (31.6)	22 (28.6)	23 (28.4)	20 (26.3)	19 (29.7)	8 (27.6)
5.1-10.0	33 (41.3)	42 (51.9)	32 (42.1)	37 (48.1)	35 (43.2)	38 (50.0)	30 (46.9)	11 (37.9)
10.1-15.0	17 (21.3)	11 (13.6)	14 (18.4)	12 (15.6)	16 (19.8)	10 (13.2)	9 (14.1)	8 (27.6)
15.1-20.0	7 (8.8)	5 (6.2)	5 (6.6)	4 (5.2)	4 (4.9)	5 (6.6)	3 (4.7)	0 (0.0)
20.1-25.0	1 (1.2)	0 (0.0)	1 (1.3)	1 (1.3)	3 (3.7)	3 (3.9)	1 (1.6)	1 (3.4)
>25.0	1 (1.2)	0 (0.0)	0 (0.0)	1 (1.3)	0 (0.0)	0 (0.0)	2 (3.1)	1 (3.4)
Total	80	81	76	77	81	76	64	29

"Implicit Import Tariff Rate" (Import Duties % Imports Goods & Nonfactor Services)

Range (%)	1980 (%)	1981 (%)	1982 (%)	1983 (%)	1984 (%)	1985 (%)	1986 (%)	1987 (%)
0.0-5.0	5 (7.6)	7 (10.4)	5 (7.8)	6 (9.5)	7 (10.3)	7 (11.1)	4 (7.5)	1 (4.3)
5.1-10.0	9 (13.4)	9 (13.4)	11 (17.2)	7 (11.1)	7 (10.3)	7 (11.1)	6 (11.3)	0 (0.0)
10.1-15.0	11 (16.4)	15 (22.4)	16 (25.0)	16 (25.4)	15 (22.1)	12 (19.0)	10 (18.9)	7 (30.4)
15.1-20.0	16 (23.9)	21 (31.3)	14 (21.9)	19 (30.2)	17 (25.0)	17 (27.0)	17 (32.1)	5 (21.7)
20.1-25.0	12 (17.9)	8 (11.9)	11 (17.2)	9 (14.3)	11 (16.2)	12 (19.0)	6 (11.3)	5 (21.7)
>25.0	14 (20.9)	7 (10.4)	7 (10.9)	6 (9.5)	11 (16.2)	8 (12.7)	10 (18.9)	5 (21.7)
Total	67	67	64	63	68	63	53	23

"Implicit Export Tariff Rate" (Export Duties % Exports Goods & Nonfactor Services)

Range (%)	1980 (%)	1981 (%)	1982 (%)	1983 (%)	1984 (%)	1985 (%)	1986 (%)	1987 (%)
0.0-5.0	40 (63.5)	48 (77.4)	48 (78.9)	46 (76.7)	53 (80.3)	50 (82.0)	40 (81.6)	18 (78.3)
5.1-10.0	16 (25.4)	11 (17.7)	11 (18.0)	9 (15.0)	8 (12.2)	6 (9.8)	4 (8.2)	2 (8.7)
10.1-15.0	0 (0.0)	1 (1.6)	0 (0.0)	3 (5.0)	1 (1.5)	2 (3.3)	2 (4.1)	1 (4.3)
15.1-20.0	3 (4.8)	1 (1.6)	0 (0.0)	0 (0.0)	1 (1.5)	0 (0.0)	1 (2.0)	1 (4.3)
20.1-25.0	0 (0.0)	0 (0.0)	1 (1.6)	1 (1.6)	2 (3.0)	0 (0.0)	0 (0.0)	0 (0.0)
>25.0	4 (6.3)	1 (1.6)	1 (1.6)	1 (1.6)	1 (1.5)	3 (4.9)	2 (4.1)	1 (4.3)
Total	63	62	61	60	66	61	49	23

Source: Taxes on international trade are from the IMF Govt. Finance statistics file;
Exports and Imports of goods and nonfactor services are from IEC data file.

62. Table 9 lists the countries in the Fund's **Annual Report on Exchange Arrangements and Exchange Restrictions** with "cost-related import restrictions" (import surcharges and advance import deposits) as features of the trade and exchange system, as well as other countries not included in the Fund's list but with import and export duties of at least 10 percent of imports and exports of goods and nonfactor services, respectively. The "implicit average import tariff rate" varies substantially among the countries, ranging from 1 percent in Greece to 45 percent in India. It should also be noted that these average taxation rates on imports often mask some fairly high tariffs protecting individual import-sensitive industries, although in practice the bulk of transactions may take place within a relatively narrow tariff schedule.

63. The data in Table 9 reinforce the features evident in Table 8: that most trade taxes are imposed on imports; their incidence is dispersed in both low- and mid-income countries; and the implicit tariff rate in low-income countries (e.g.,Bangladesh, Gambia, India, Myanmar, Pakistan, Sudan, Sierra Leone) averages 25 percent, which is twice that imposed by the middle-income economies.

Table 9: Incidence of Import and Export Taxes
in Selected Developing Countries

	Country	Import Duties % Imports GNFS	Export Duties % Export GNFS	Total Duties % Total GNFS
X	Argentina	36.2 /1984	8.9 /1984	9.2 /1984
GFS	Bangladesh	26.9 /1985	6.1 /1985	17.9 /1985
X	Belize	21.7 /1985	1.0 /1985	11.2 /1985
GFS	Botswana	17.0 /1986	1.0 /1985	7.4 /1986
X	Burkina Faso	15.2 /1987	1.6 /1987	10.5 /1987
GFS	Burundi	15.6 /1986	32.9 /1986	21.9 /1986
GFS	Cameroon	19.0 /1987	2.5 /1987	9.3 /1987
X	China	na	na	na
X	Colombia	20.1 /1987	1.0 /1987	8.3 /1987
GFS	Comoros	21.1 /1987	13.2 /1986	13.8 /1987
X	Congo	7.7 /1980	1.0 /1980	3.8 /1980
X	Costa Rica	20.8 /1986	5.5 /1986	7.4 /1986
X	Cote D'Ivoire	31.3 /1985	5.6 /1985	9.7 /1985
X	Cyprus	na	na	na
X	Djibouti	2.6 /1986	1.0 /1986	1.6 /1986
X	Dominican Rep.	20.5 /1986	3.2 /1986	9.9 /1986
X	Ecuador	15.6 /1985	1.0 /1985	6.2 /1985
X	Egypt	18.2 /1987	1.0 /1987	11.5 /1987
GFS	El Salvador	19.1 /1987	10.6 /1987	6.9 /1987
GFS	Fiji	15.8 /1986		7.7 /1986
GFS	Gabon	19.3 /1985	1.1 /1985	6.7 /1985
GFS	Gambia	25.5 /1987	1.0 /1987	13.6 /1987
GFS	Ghana	10.1 /1987	17.4 /1987	13.5 /1987
X	Greece	1 0 /1985	na	na
X	Grenada		na	na
X	Guatemala	11.1 /1982	3.8 /1982	4.5 /1982
X	Guinea	na	na	na
GFS	Guinea-Bissau	na	na	24.1 /1987
X	Haiti	11.9 /1987	1.3 /1987	6.8 /1987
GFS	Honduras	20.2 /1981	6.4 /1981	8.1 /1981
X	India	45.7 /1987	26.1 /1987	
X	Indonesia	3.7 /1987	3.5 /1987	3.6 /1987
X	Iran Iraq	na	na	11.9 /1985
X	Iraq	na	na	na
X	Israel	na	3.0 /1985	
X	Jamaica	na	na	1.6 /1981
X	Jordan	na	na	7.2 /1986
X	Kenya	17.5 /1986	2.6 /1986	7.4 /1986
X	Lebanon	na	na	na
X	Liberia	14.0 /1986	1.1 /1986	6.2 /1986
X	Libya	na	na	na
X	Madagascar	15.0 /1982	3.8 /1982	8.1 /1982
X	Malawi	15.3 /1986	1.0 /1986	7.6 /1986
GFS	Mali	14.6 /1987	3.6 /1987	8.5 /1986
X	Mauritius	19.5 /1988	3.2 /1988	8.2 /1988
GFS	Myanmar	na	na	14.6 /1985
X	Nepal	12.0 /1984	1.0 /1984	7.2 /1984
X	Netherland Ant.	na	na	na

Table 9 (Cont): Incidence of Import and Export Taxes
in Selected Developing Countries

/1	Country	Import Duties % Imports GNFS	Export Duties % Export GNFS	Total Duties % Total GNFS
X	Nicaragua	na	na	na
X	Pakistan	29.5 /1986	1.6 /1986	17.7 /1986
X	Panama	11.8 /1986	1.0 /1986	5.3 /1986
X	Paraguay	3.4 /1986	1.0 /1986	2.1 /1986
X	Peru	21.7 /1986	2.7 /1986	10.5 /1986
X	Philippines	12.0 /1986	1.0 /1986	4.9 /1986
GFS	Poland	14.8 /1987	1.1 /1987	6.4 /1987
GFS	St. Lucia	14.9 /1986	1.0 /1986	7.6 /1986
GFS	St. Vincent	16.6 /1986	1.0 /1986	8.6 /1986
GFS	Senegal	15.8 /1984	1.0 /1984	8.8 /1984
X	Sierra Leone	28.9 /1987	1.0 /1987	13.2 /1987
X	Somalia	17.8 /1978	1.1 /1978	12.5 /1978
X	South Africa	3.6 /1985	1.0 /1985	1.4 /1985
GFS	Sri Lanka	21.1 /1988	3.9 /1988	10.7 /1988
X	Sudan	25.1 /1981	5.8 /1981	17.5 /1982
X	Suriname	16.8 /1986	1.0 /1986	8.5 /1986
GFS	Swaziland	14.8 /1986	1.0 /1986	7.9 /1986
X	Syria	8.9 /1987	1.0 /1986	5.8 /1986
X	Thailand	11.3 /1987	1.0 /1987	5.3 /1987
GFS	Togo	19.5 /1986	1.0 /1986	11.0 /1986
X	Trinidad	7.8 /1981	na	3.5 /1981
GFS	Tunisia	23.3 /1984	1.0 /1984	13.1 /1984
X	Turkey	5.9 /1987	1.0 /1987	3.1 /1987
GFS	Uganda	3.1 /1986	32.6 /1986	16.0 /1986
X	Uruguay	18.1 /1987	1.0 /1987	7.5 /1987
X	Vanuatu	18.2 /1986	1.6 /1986	12.5 /1986
GFS	Venezuela	25.0 /1986	na	12.5 /1986
X	Yemen AR	14.8 /1987	na	13.2 /1987
X	Yemen PDR	na	na	na
X	Yugoslavia	13.2 /1987	na	6.5 /1987
GFS	Zaire	19.7 /1986	5.1 /1986	
X	Zambia	24.0 /1988	7.4 /1988	8.5 /1987
X	Zimbabwe	16.4 /1985	na	8.0 /1985
	Total	81 X = 56 GFS = 25		

Sources: IMF, **Annual Report on Exchange Arrangements and Exchange Restrictions**, 1989;
Import and exports duties are from the IMF file on Government Finance Statistics.

1/ " X "denotes countries identified in the Fund's **Annual Report on Exchange Arrangements and Exchange Restrictions** with "cost-related import restrictions" (import surcharges and advance import deposits) as features of the trade and exchange system.

" GFS " denotes other countries not included in the X list with import and export duties of at least 10 % of imports and exports of GNFS, respectively

"Trade Tax-Effective" Conversion Factors

64. Given the high incidence and relatively high implicit tariff rates on imports (and heavy export taxes in a few countries) shown in Tables 8 and 9, there are strong reasons to examine conversion factors that reflect the impact of substantial tariffs and subsidies. *A priori*, it is reasonable to expect that countries with cost-related restrictions on international transactions would exhibit large deviations between the transaction rate and the official exchange rate. In situations where tariffs and subsidies are widely dispersed and substantial, the price (i.e.; conversion factor) paid for or received by transactors differs from the price denoted by the official exchange rate. In essence, we need to compute so-called "tax-effective" import and export prices (i.e.; conversion factors) as well as a conversion factor that represents an overall "trade-tax effective" conversion factor. Significant deviations of the overall "trade-tax effective" conversion factor from the official exchange rate should be taken as a signal that further review of the adequacy of official exchange rate as a conversion factor merits consideration.

65. The majority of developing countries (90 percent) for which data are available impose export duties considerably less than 10 percent (see Table 8); that is to say that the impact of export taxes on the transaction rate is small. Therefore the last column in Table 9 (total duties % total goods and nonfactor services) is a close proxy for the magnitude of the deviations of the "trade-tax-effective" conversion factors from the official rates.

66. Table 10 illustrates an approach towards computing "trade-tax-effective" conversion factors. Because data on subsidies are not available, the computational approach shown

below does not take into account the impact of subsidies. To illustrate the *a priori* reasoning that countries with high cost-related restrictions on international transactions would exhibit larger deviations between the transaction rate and the official rate, Table 10 illustrates the impact in two differing situations. India's trade system is characterized by high price-measure restrictions, particularly on imports; the implicit import tariff rate is over 40 percent since the mid-1980s. On the other hand, the Malaysian trade system is relatively restriction free. As seen in Table 10 (indicator K), there is a marked difference in the magnitude of the deviation of the "trade-tax effective" conversion factor (TTXR) from the official exchange rate between the two countries. In Malaysia, the conversion factor effectively used in trade is virtually no different from the official exchange rate; on the other hand, in India the conversion factor in international transactions is some 25 percent more depreciated than that represented by the official exchange rate.

67. It is apparently clear that where we know that a country's trade and payments system is very restrictive, the use of the official exchange rate as a general conversion factor needs further examination. In such a situation, attempts should be made to estimate a conversion factor that takes into account the impact of the trade restrictions (e.g., the "trade tax-effective" conversion factor). It is suggested that this be done for countries shown in the Fund's **Annual Report on Exchange Arrangements and Exchange Restrictions** as having "cost-related import restrictions", supplemented with a country list (other than those listed in the above-mentioned Fund document) with high import and export duties.

Table 10: "Tax-Effective" Conversion Factors for Imports and Exports

INDIA: HIGH TARIFFS/SURCHARGES	1980	1981	1982	1983	1984	1985	1986	1987
Basic Data								
A. Total Duties % Total GNFS /1	15.52	17.17	20.17	19.06	19.15	24.24	27.56	26.09
B. Import Duties % Import GNFS /1	24.66	28.12	33.63	32.43	32.94	39.74	46.06	45.10
C. Export Duties % ExportS GNFS /1	1.33	0.60	0.63	0.64	0.52	0.53	0.56	0.43
D. Imports GNFS % Total GNFS	60.83	60.22	59.22	57.96	57.46	60.47	59.33	57.46
E. Exports GNFS % Total GNFS	39.17	39.70	40.78	42.04	42.54	39.53	40.67	42.54
F. IFS_RF	7.8629	8.6585	9.4551	10.0990	11.3630	12.3690	12.6110	12960
G. EXR_ATLAS	7.8930	8.9290	9.6280	10.3120	11.8870	12.2370	12.7870	13.0000
DERIVED INDICATORS								
H. ExRate."Import-Tax" Effective (ITXR) /1	9.8017	11.0928	12.6346	13.3738	15.1057	17.2844	18.4198	18.8075
I. ExRate."Export-Tax" Effective (ETXR) /1	7.7580	8.6066	9.3955	10.0345	11.3034	12.3029	12.5403	12.9068
J. ExRate."Trade-Tax" Effective (TTXR) /1	9.0011	10.1038	11.3135	11.9699	13.4883	15.3150	16.0286	16294
K. Ratio: TTXR/IFS_RF	1.1448	1.1669	1.1966	1.1853	1.1870	1.2382	1.2710	12573
L. Ratio: TTXR/EXR_ATLAS	1.1404	1.1316	1.1751	1.1608	1.1347	1.2515	1.2535	12536
M. Index Real Effective ExRate	100.00	111.96	124.35	128.09	137.27	150.20	151.20	14790

MALAYSIA: LOW TARIFFS/SURCHARGES	1980	1981	1982	1983	1984	1985	1986	1987
Basic Data								
A. Duties % Total GNFS /1	7.71	7.00	5.83	5.93	5.64	5.37	4.17	3.54
B. Import Duties % Import GNFS /1	7.06	6.66	6.21	6.51	6.48	6.53	5.70	4.87
C. Export Duties % Export GNFS /1	8.34	7.38	5.40	5.28	4.84	4.32	2.80	2.50
D. Imports GNFS % Total GNFS	48.89	52.79	53.94	52.64	49.11	47.55	47.10	43.91
E. Exports GNFS % Total GNFS	51.11	47.21	46.06	47.36	50.89	52.45	52.90	56.09
F. IFS_RF	2.1769	2.3041	2.3354	2.3213	2.3436	2.4831	2.5814	25196
G. EXR_ATLAS	2.1769	2.3041	2.3354	2.3213	2.3436	2.4831	2.5814	25196
DERIVED INDICATORS								
H. ExRate."Import-Tax" Effective (ITXR) /1	2.3305	2.4576	2.4803	2.4724	2.4954	2.6419	2.7270	26428
I. ExRate."Export-Tax" Effective (ETXR) /1	1.9954	2.1341	2.2093	2.1988	2.2301	2.3728	2.5077	24570
J. ExRate."Trade-Tax" Effective (TTXR) /1	2.1593	2.3049	2.3555	2.3429	2.3604	2.5008	2.6110	25386
K. Ratio: TTXR/IFS_RF	0.9919	1.0003	1.0086	1.0093	1.0072	1.0084	1.0120	10074
L. Ratio: TTXR/EXR_ATLAS	0.9919	1.0003	1.0086	1.0093	1.0072	1.0072	1.0115	10075
M. Index Real Effective ExRate	100.00	109.77	115.12	114.05	116.63	124.79	129.24	128.88

COMPUTATION PROCEDURES: /1

H. ExRate."Import-Tax" Effective = [F x (1+B)]

I. ExRate."Export-Tax" Effective = [F x (1-C)]

J. ExRate."Trade-Tax" Effective = [(H x D) + (I x E)]

/1 Because data on subsidies are not available, their impact on the respective conversion factors is not reflected in the computations shown above.

Table 10 above illustrates the types of data IEC staff is expected to cull from various Bank and Fund documents to support the estimation of an alternative conversion factor that gives some recognition to price-measure restrictions.

Deviations of "Trade Tax-Effective" Exchange Rates

68. Table 11 below shows the distribution of the deviations of the "trade tax-effective" rate from the official rate. The distribution shown here is very similar to that of total duties imposed on trade in goods and nonfactor services shown earlier in Table 8. In Table 11, some 30 percent of developing countries for which data are available show deviations greater than 10 percent in the "trade tax-effective" conversion factor; similarly, Table 8 shows that the "implicit tariff rate" of 10 percent or greater is imposed in some 30 percent of developing countries.

Table 11: Distribution of Deviations of "Trade Tax-Effective" Rate from Official Rate

Range (%)	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
0.0-1.0	1	1	1	1	1	1	1	3	2	2	2	3	6
1.1-5.0	17	21	17	18	18	19	20	22	19	19	17	14	6
5.1-10.0	32	35	33	30	30	31	39	29	33	32	35	27	10
10.1-15.0	15	15	16	18	15	17	10	12	11	15	8	8	7
15.1-20.0	9	6	5	6	7	7	5	5	3	3	4	1	0
20.1-25.0	2	1	5	2	2	1	0	1	1	3	3	1	0
25.1-30.0	0	0	1	3	1	0	0	0	0	0	0	2	1
>30	1	1	1	1	2	1	1	1	1	1	1	1	0
Total:	77	81	79	79	76	77	76	73	70	75	70	57	30

Countries for Review and Adjustment for Trade Taxes

69. Table 12 below lists countries[31] with "implicit tariff rates" of at least 10 percent. In the context of the search for an appropriate general purpose conversion factor, the list represents the suggested countries for review, and adjustment if necessary, in the official exchange rate to take into account the cost-related restrictions in the and trade system. It should be emphasized that in the review process, Operations staff should be encouraged to provide data on subsidies if they form a significant part of the trade system.

Table 12: Selected Countries for Review and Adjustment of Official Rate for Trade Taxes

Country	"Implicit Tariff Rate" (%)	Country	"Implicit Tariff Rate" (%)
Bangladesh	17.9 /1985	* Pakistan	17.1 /1986
* Belize	11.2 /1985	* Peru	10.5 /1986
* Burkina Faso	10.5 /1987	Sierra Leone	13.2 /1987
Burundi	21.6 /1986	* Somalia	12.5 /1978
Comoros	13.8 /1987	Sri Lanka	10.7 /1988
* Egypt	11.5 /1987	* Sudan	17.5 /1982
Gambia	13.6 /1987	Togo	11.0 /1986
Ghana	13.5 /1987	Tunisia	13.1 /1984
Guinea-Bissau	24.1 /1987	Uganda	16.0 /1986
* India	26.1 /1987	* Vanuatu	12.5 /1986
* Iran	11.9 /1985	Venezuela	12.5 /1986
Myanmar	14.6 /1985	* Yemen AR	13.2 /1987

Source: Table 9

* Countries identified in the Fund's **Annual Report on Exchange Arrangements and Exchange Restrictions** with "cost-related import restrictions."

[31] Based on the Fund's 1989 **Annual Report on Exchange Arrangements and Exchange Restrictions**, and supplementary information from the Fund's Government Finance Statistics file.

VII. VOLATILITY in EXCHANGE RATES and TRADE VOLUMES

70. In addition to taxes and subsidies and the use of multiple exchange systems in international trade directly applicable to the conversion of local currency into foreign exchange, the conversion factor should also encompass volatility in exchange rate and volume of trade during the period in question. The following paragraphs of the paper examines the merchandise-trade weighted conversion factor (MWXR) that captures volatility in the exchange rates and traditional cycles or fluctuations in the volumes of trade transactions. Because of large variations in the official rate, the MWXR encompasses the recommendation stated in Section II, para.13 above: that shorter period data (e.g., quarterly exchange rates and trade volumes) should be used and then summed to derive longer period data, e.g., annual exchange rates and trade volumes.

Merchandise-Weighted Conversion Factors

71. Each average quarterly exchange rate from the **IFS** is weighted by the respective shares of the corresponding quarterly total merchandise trade (exports plus imports) in the annual total trade according to this relationship:

$$MWXR = \sum_{i=Q_1}^{Q_4} w_i \cdot RF_i$$

where

MWXR = merchandise-weighted conversion factor;

w_i = merchandise trade weight in Quarter i

$$\frac{(x_i + m_i)}{\sum (x_i + m_i)}$$

x_i = merchandise exports in Quarter i;

m_i = merchandise imports in Quarter i;

RF_i = official exchange rate in Quarter i;

i = Quarter 1,2,3 4

Deviations of Merchandise-Weighted Exchange Rates

72. The magnitude of the deviations of merchandise-weighted rates (MWXR) from the average annual official rates for the period 1980-88 are presented in Table 13. A closer examination of the percent deviations of MWXR from the official rate reveals that for most countries the deviations are relatively minor. Consistently about 95 percent of the countries exhibit deviations of less than 5% over the period 1980-88, as shown in Table 13. Thus, it is evident from the results presented in Table 13 that the MWXRs, in general, do not reveal anything significant about the preference order between the MWXR and the official rate for most countries.

Table 13: Distribution of Deviations of MWXR from IFS_RF

Deviation (%)	1980	1981	1982	1983	1984	1985	1986	1987	1988
0	15	14	14	12	9	8	7	10	7
0.1-1.0	62	54	52	53	49	52	59	50	40
1.1-2.0	2	7	7	6	12	9	5	3	7
2.1-3.0	2	2	2	2	3	4	4	4	0
3.1-4.0	1	2	2	1	0	0	0	3	6
4.1-5.0	0	1	2	0	1	2	0	0	1
5.1-6.0	1	0	0	1	2	0	0	2	0
6.1-7.0	0	0	0	1	2	1	1	0	1
7.1-8.0	0	0	2	1	0	1	0	1	0
8.1-9.0	0	1	0	0	1	0	0	0	0
9.1-10.0	0	0	0	0	0	0	1	2	0
10.1-15.0	0	2	0	1	1	2	0	2	0
15.1-20.0	0	0	1	2	0	1	2	0	2
20.1-25.0	0	0	0	0	0	0	0	0	0
25.1-30.0	0	0	0	0	1	0	0	0	1
>30.0	0	0	0	2	1	0	1	0	2
Total	83	83	82	82	82	80	80	77	67

Source: IFS

Countries for Review and Adjustment for Volatility

73. Nevertheless, any large deviations should be taken as signals that the MWXR could be the preferred choice among the two rates. The results do suggest, however, that for three countries in particular the use of MWXR, instead of the official exchange rate, merits consideration. The three countries showing strong deviations are Argentina, Brazil, and Yugoslavia. Any decision on the preference order between MWXR and official rate would have to take into account relevant country-specific knowledge, not just the magnitudes of the deviations between the two rates.

74. Argentina offers some interesting observations which account for the relatively large percent deviations of its MWXR from the official rate. A closer look at the quarterly official exchange rate (Table 14 below) reveals significant volatility in the quarterly rates in the 1980s.

Table 14: ARGENTINA --Fluctuating Quarterly Exchange Rates and Trade Weights

	IFS Quarterly Rates				% Change		
	Q1	Q2	Q3	Q4	Q2	Q3	Q4
1980	0.00017	0.00018	0.00019	0.00020	7.0	5.2	3.5
1981	0.00022	0.00038	0.00051	0.00065	71.3	36.5	27.0
1982	0.00103	0.00137	0.00377	0.00420	33.2	176.0	11.4
1983	0.00575	0.00782	0.01073	0.01781	35.9	37.3	66.0
1984	0.02784	0.04118	0.06934	0.13224	47.9	68.4	90.7
1985	0.24952	0.55672	0.80050	0.80050	123.1	43.8	0.0
1986	0.80050	0.84896	0.97216	1.15051	6.1	14.5	18.3
1987	1.40493	1.61000	2.14627	3.41599	14.6	33.3	59.2
1988	4.37877	6.79771	11.18150	12.65240	55.2	64.5	13.2

	Trade Weights				% Change		
	Q1	Q2	Q3	Q4	Q2	Q3	Q4
1980	0.2172	0.2240	0.2662	0.2926	3.1	18.8	10.0
1981	0.1263	0.2403	0.3309	0.3024	90.2	37.7	-8.6
1982	0.1439	0.1970	0.2455	0.4136	36.9	24.6	68.5
1983	0.1308	0.2002	0.2643	0.4048	53.1	32.0	53.2
1984	0.1071	0.1836	0.2831	0.4262	71.5	54.2	50.5
1985	0.0953	0.2654	0.3336	0.3057	178.3	25.7	-8.4
1986	0.1781	0.2427	0.2876	0.2916	36.3	18.5	1.4
1987	0.1408	0.1903	0.2613	0.4076	35.2	37.3	56.0
1988	0.0897	0.1838	0.3500	0.3765	104.9	90.5	7.6

% Deviations of MWXR from IFS_RF			
1980	0.7	1985	13.5
1981	10.2	1986	2.2
1982	18.9	1987	14.6
1983	17.4	1988	17.9
1984	27.9		

Source: IFS

This is compounded by the fluctuations in Argentina's quarterly trade shares where, traditionally, a high proportion of total trade occurs in the third and fourth quarters. Together, they account for the large deviations of the merchandise-weighted conversion factor form the unweighted official exchange rate. A closer look at Table 14 reveals that the small deviation in MWXR in 1980 is the result of relative stability in exchange rates and the dispersion of total trade, by quarters, in 1980; similar observations are seen in 1986. The outcome of the high volatility in exchange rates and trade shares in the other years is obvious: large deviations between MTXR and official rate. It is obvious that while the official rate encompasses the unweighted exchange rate changes over the entire year, its suffers from the drawback of not encompassing the volumes of transactions at each of these fluctuating rates; hence the need for a weighted conversion factor based on shorter period (quarterly) data.

VIII. USE of PERIOD AVERAGE EXCHANGE RATES in the BANK

75. In principle, the Bank adopts the unweighted annual average of the official exchange rate (line **rf** in **IFS**) for conversions between national currency and U.S. dollar values, except in those instances where it was seriously considered that this rate was "inappropriate" and that consideration of an alternative conversion factor is warranted only when the difference between the official exchange rate and that applying to the average of foreign transactions is egregiously large.

Shorter Periods to Longer Period Rates

76. Market rates, however, vary from day to day, but the various types of data series that need to be converted to a common currency (e.g., GNP, foreign trade, balance of payments, etc.) are compiled over a period -- usually quarters or years. Thus longer period data are the sums of the compilation period. It follows that the use of prevailing market rate conversion requires the use of averages.

77. The primary requirement for converting longer period data is that the conversion should be made from shorter period data and that longer period data be calculated as the sums of the converted short period data. For example, the monthly (quarterly) foreign trade statistics, if available, in national currencies should be converted with the respective

average monthly (quarterly) exchange rates and then summed to obtain the annual data instead of summing the monthly (quarterly) data and then converting with the average annual exchange rates. The major drawback of the latter instance is that the annual average exchange rates may not be in accord or conform with the known contributions of the annual data within the monthly (quarterly) time periods. Given country X's traditional, say, fourth quarter's trade or current account surplus together with fluctuating fourth quarter's exchange rate, any difference in the conversion procedure will result in noticeable effects on the longer period data expressed in the common numeraire.

78. The recommendation is obviously clear ... that whenever shorter period data are available these should be converted at the average of monthly (or even daily) rates and then summed to derive longer period data, e.g.,annual data. One should, however, draw the distinction between what is desirable and what is statistically feasible. Consideration of statistical feasibility would preclude deriving an overall conversion factor based on highly disaggregated levels involving various commodities at respective rates. More often than not many macroeconomic data (e.g., GDP, GNP) from developing countries are not available for the shorter periods but are usually available as annual observations. In the extreme circumstance where volatility in the exchange rates is accompanied by fluctuating volumes of international transactions, the adequacy of the official exchange rate as a conversion factor becomes questionable. An alternative conversion factor in such a situation may be in the form of weighted exchange rates at a highly aggregated level e.g., merchandise trade weighted exchange rate (discussed in Section VII above) which will capture traditional cycles not only in the data but also in exchange rates.

Search for a General Purpose Conversion Factor

79. Much of the Bank's analytical work on development in member countries and on the efficacy of policies require inter-country (region) comparisons which require, at some stage, the conversion of indicators expressed in national currencies into a common numeraire. While it is clear that the preferential method of conversion is to use the prevailing or market valuations, their determination is not without ambiguity, even for international transactions that are relatively free of exchange and trade restrictions. Furthermore, the national currency value of a country's GNP does not change at the moment its exchange rate changes; it is the measurement of its value in foreign currency that changes. Many value aggregates in GNP are not aggregates of international transactions and there is, therefore, no uniquely "true" conversion factor. They are converted to a common currency only for the purpose of international comparison. Thus the search for an appropriate conversion factor should be viewed as a search for a general purpose conversion factor that applies to major economic aggregates.

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